



Repairs of the electrical installation in Škoda vehicles

Self-study programme

Introduction

This publication was created with the aim of supporting the service network of Škoda in the proper execution of repairs of the electrical installation for vehicles and summarises all the important principles and recommendations regarding the prescribed operation, use of recommended tools and equipment according to the valid service documentation, including the notes for the corresponding passages in the current literature.

At the same time, the examples referring to incorrect repair procedures which are listed most often and occur most frequently as well as their negative effects and recommendations on how the repair should be performed in the correct way, are listed here.

The corresponding module of the service training is an addition to this Self-Study Programme No. 92.

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1. Škoda service documentation: Correct method of carrying out repairs of the electrical installation

Source: Škoda workshop manual; electrical systems - general information; 97 - cable - selected chapters relating to the repairs of the electrical installation.

1.1. Compliance with the repair procedures according to the valid service documentation

General repair instructions for the electrical system of the vehicle

WARNING!

- › On modules affixed with stickers that warn of high voltage in the system of the vehicle, the residual voltage must be eliminated before the repair (e.g. switch on the consumer after disconnecting the battery and subsequently switch it off again).
- › Some tools have a protective cap which has to be refitted on the tip of the tool after using it, because of the possible injury and damage to the tip.

Note

- › Comply with country-specific regulations.
- › When disconnecting and connecting the battery, follow the prescribed procedure Electrical systems; repair group 27.
- › Before beginning the repair, the cause of damage must first be resolved, such as sharp edges of the body parts, defective power consumers, corrosion, etc.



Note

- › If possible, do not loosen the earth straps at the body (risk of corrosion).
- › Comply with the current instructions in the relevant workshop manual when carrying out repairs.

General repair instructions for conductor bundles and plug connectors



Note

- › Comply with the general repair instructions for the electrical system of the vehicle
- › Do not solder when repairing the electrical system of the vehicle.
- › After pressing, the press coupling must shrink when using a hot air gun in order to prevent moisture from penetrating.
- › The shielded cables, such as, for example, the cables for the speed and knock sensors, must not be repaired. If damaged, they must be completely replaced.
- › If the required cross-section of the conductor bundle does not exist in the repair set, the next larger cross-section must be used.
- › Mark the repair points with a yellow adhesive tape.
- › The points of the cable set, which are marked with the yellow adhesive tape, identify the previous repair.
- › Carry out a function test after each repair. If possible display the faults stored in the memory, erase the faults and if necessary carry out the basic setting of the repaired system using the VAS diagnostics, measuring and information system

1.2. Repair of the conductor bundles and plug connectors

Required special tools, test and measuring devices and auxiliary means

- › Service case for the repair of the electrical bundles S504500V
 - › Set with release tool (cutter) for plug connectors S506815V
 - › Set with release tool (cutter) for plug connectors S506825V
- or:
- › Service case for repair of electrical bundles VAS 1978B
 - › Set of release tools (cutter) for plug connectors VAS 1978/35 supplemented by the set of release tools (cutter) S506840V

The service case contains the necessary tool (except the set **of release tools**) and the material. Quality repairs of the electrical networks can be carried out with the service case. The repairs of the plug connectors and interrupted lines can be carried out with the tools.

The complete repair instructions are used for the repair of crimped plug connectors and press couplings, that are connected to the conductor bundles in the vehicle.

Repair instructions from the Electronic catalogue of original parts (ETKA).

The crimping tool provided with three different pressing profiles and the hot air gun serve to shrink the press couplings in order to properly connect the cables.

For any subsequent order, simply name the order number for the spare part which you can find in the converter table enclosed with the operating instruction.

The set **of release tools (cutter)** is used to release various primary and secondary plug connectors in the terminal trips.

The systems with circular plug connectors and the flat contacts with one or two detents can be properly released or installed as well as the simple cables can be sealed using the cutters.



Note

- › Additional information and use of the set Operating instruction for the service case.
- › The assignment of the correct release tools can be found in the table, see Operating instruction for the set release tools.

1.2.1. Repair of the cables for pyrotechnic components



Note

- › Comply with the general repair instructions for the electrical system of the vehicle.
- › Comply with the general repair instructions for the conductor bundles and plug connectors.

WARNING!

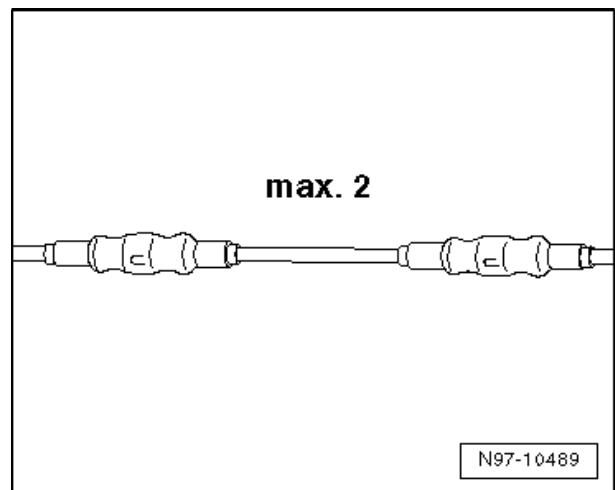
Inadequate repairs of the cables for pyrotechnic components, e.g. airbag, belt tensioner, may result in insufficient protection of the passengers.

- › To ensure a quality repair, the repairs of the cables for pyrotechnic components must be carried out exclusively with the service case for the repairs of electrical bundles using original spare parts (connector sockets, contacts, conductors, see Catalogue of original parts)
- › The cables on individual airbag units must not be repaired.
- › The corresponding airbag modules must be replaced for safety reasons in case of damage to the cables or the plug connectors on the airbag modules.



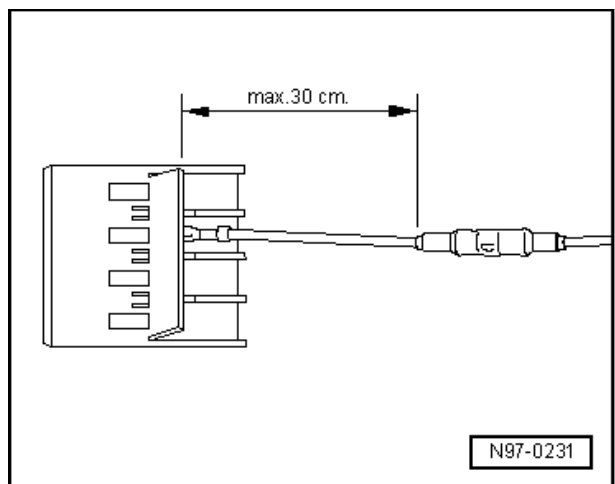
Note

- › Repairs on the cables for pyrotechnic components can only be carried out on two repair points of the cables. The repair points increase the electrical line resistance and thus induce faults in its own diagnostic system.
- › The cable with the repair point must not be put back into the original bundle in the vehicle and must be visibly marked with the yellow insulating tape.



Note

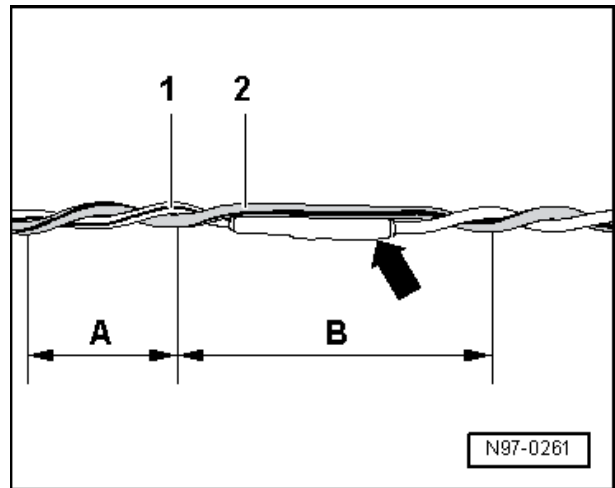
- › The repairs in the area of the pyrotechnic components should be carried out at a distance of at least 30 cm to the next connector socket. This together with the marking of the repair point with the yellow adhesive tape enables a quick overview of previous repairs.
- › Both cables for the airbag igniters are twisted with a twist length of 20 ± 5 mm. This twist length must be kept for the repair of the twisted cable.





Note

- › After the repair, both cables for the airbag igniters must have the same length. Upon rotation of the conductors -1- and -2- the length -A- = 20 mm must be observed.
- › Thus, the conductive part without rotated conductors (-arrow- in the repair point) must not be longer than -B- = 100 mm.



1.2.2. Repair of the cables for the CAN databus



Note

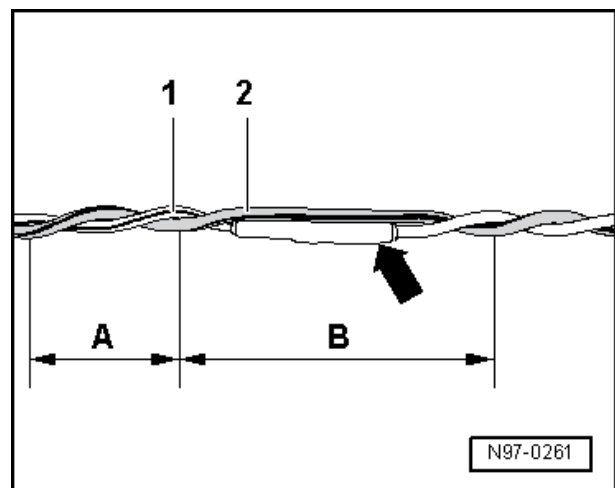
- › Comply with the general repair instructions for the electrical system of the vehicle
- › Comply with the general repair instructions for the conductor bundles and plug connectors

The unshielded twisted pair cable -1- and -2- with a diameter of 0.35 mm² or 0.5 mm².

The cables for the CAN databus are provided with the following colour coding:

CAN High line, drive	orange/black
CAN High line, Convenience	orange/green
CAN High line, infotainment	orange/purple
CAN Low line, all	orange/brown

- › After the repair, the two bus lines must have the same length. Upon rotation of the conductors -1- and -2- the twist length -A- = 20 mm must be observed.
- › Thus, the conductive part without rotated conductors (-arrow- in the repair point) must not be longer than -B- = 50 mm.



1.3.1. Repair of the cable lugs



Note

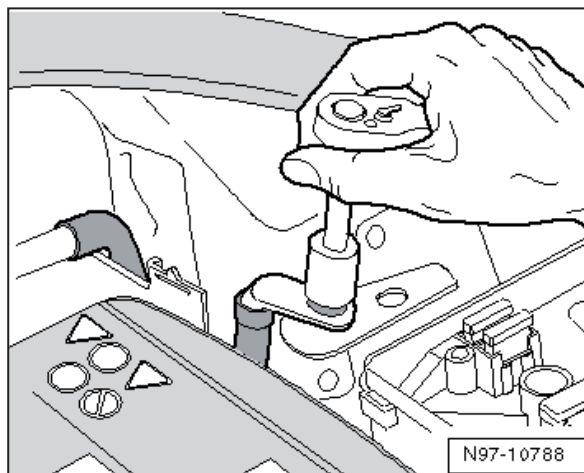
- › To avoid breaking the threaded connection such as when exceeding the tightening torque, due to the lack of static friction in the thread, no rust remover, contact spray or grease must be used on cable lugs.
- › The grey abrasive discs are only suitable for minor contaminations and "soft surfaces".
- › The red abrasive discs are only suitable for minor contaminations and "hard surfaces".

WARNING!

Risk of accident!

Pay attention to the warning notes and safety instructions when working with batteries.

- Disconnect the earth cable of the battery
Electrical systems; repair group 27.
- Unscrew the capnut and remove the cable lug from the threaded connection.
- Check the cable lug in regards to corrosion, contamination, damage, etc.
- Select a respective adapter and an appropriate polishing pad.

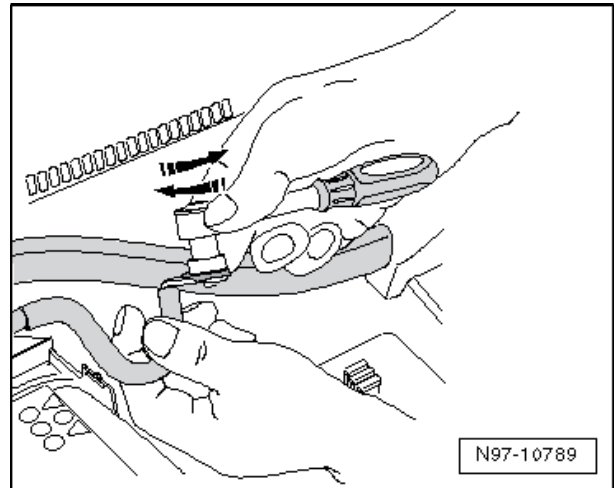


Note

- › Alternatively, a grinding slip can be used.

Note

- › Clean the cable lug carefully, so that the zinc coating is not removed.
 - › In regards to the different thicknesses of the zinc coating, it is necessary to perform a visual inspection on the cleaned surface in the course of the cleaning process.
 - › Before beginning the repair, the cause of damage must first be resolved, such as sharp edges of the body parts, defective power consumers, corrosion, etc.
- Fit an appropriate adapter onto the cable lug and remove rust and dirt by rotational movements. Check the cleaned area continuously.



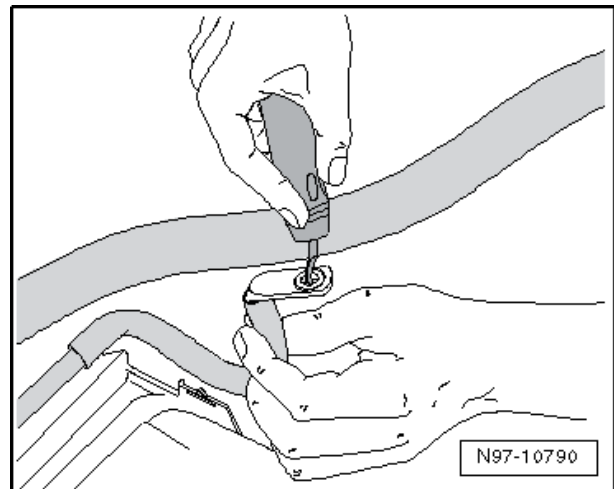
- Check the cable lug for burrs, if necessary remove them with a burr removal tool.
- Reset the cable lug and tighten to the specified tightening torque.



Note

- › The required tightening torque must be kept for an optimum contact of the cleaned components.

- After tightening, preserve the connection with a suitable preservative.
- Comply with the procedure for battery connection Electrical systems; repair group 27.



1.3.2. Repair of the threaded connections

WARNING!

Risk of accident!

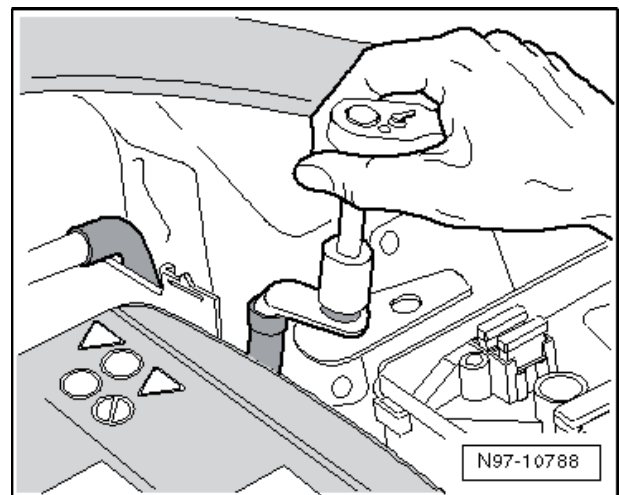
Pay attention to the warning notes and safety instructions when working with batteries Page 2.



Note

- › To avoid breaking the threaded connection such as when exceeding the tightening torque, due to the lack of static friction in the thread, no rust remover, contact spray or grease must be used for battery terminals.
- › The grey abrasive discs are only suitable for minor contaminations and "soft surfaces".
- › The red abrasive discs are only suitable for minor contaminations and "hard surfaces".

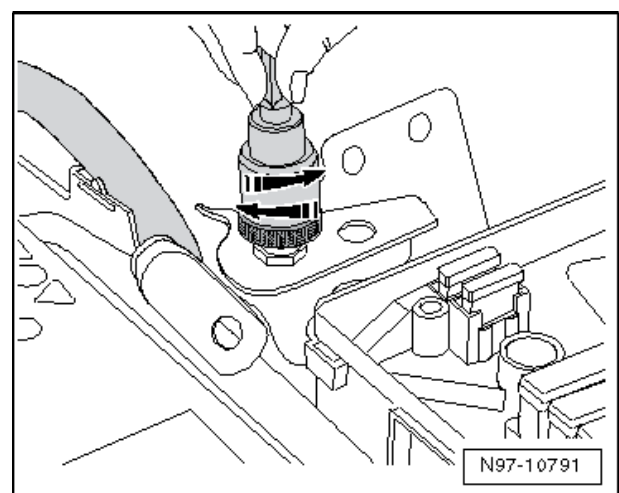
- Disconnect the earth cable of the battery Electrical systems; repair group 27.
- Unscrew the capnut and remove the cable lug from the threaded connection.
- Check the threaded connection in regards to corrosion, contamination and damage.
- Select a respective adapter and an appropriate polishing pad.



Note

- › Clean the threaded connection carefully, so that the zinc coating is not removed.
- › In regards to the different thicknesses of the zinc coating, it is necessary to perform the visual inspection on the cleaned surface in the course of the cleaning procedure.
- › If the underlying layer of copper is exposed when removing the zinc coating, a galvanic cell can occur, causing intense corrosion.

- Fit an appropriate adapter onto the threaded connection and remove rust and dirt by rotational movements. Check the cleaned area continuously.
- After cleaning, screw together the connections to the specified tightening torque, if necessary with the protection against rotation.
- Preserve the threaded connections with the appropriate preservative page 29.
- Comply with the procedure for battery connection Electrical systems; repair group 27.



1.3.3. Cleaning the battery terminals and poles

WARNING!

Risk of accident!

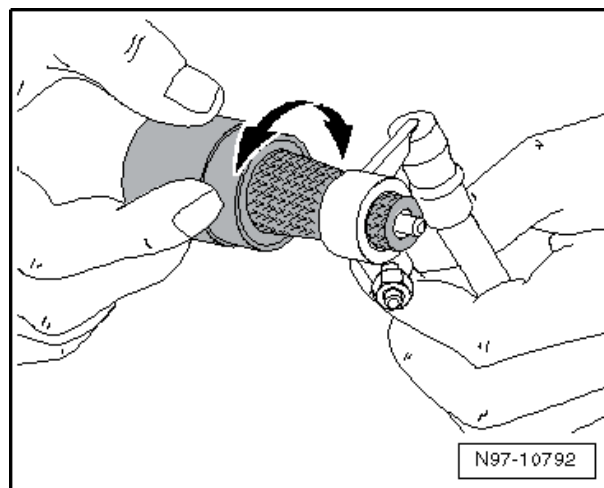
Pay attention to the warning notes and safety instructions when working with batteries Page 2.



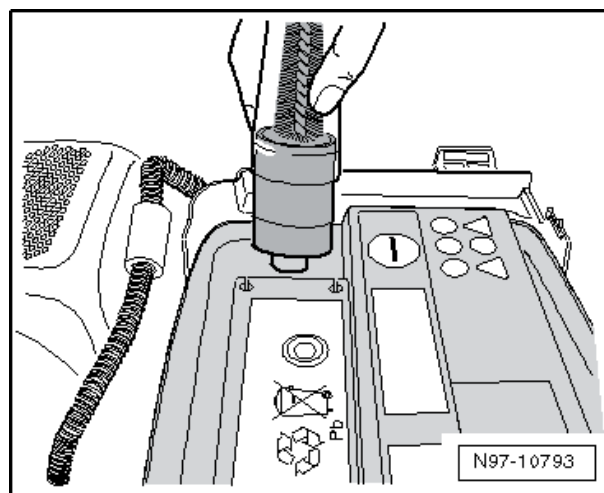
Note

› To avoid breaking the threaded connection such as when exceeding the tightening torque, due to the lack of static friction in the thread, no rust remover, contact spray or grease must be used for battery terminals.

- Disconnect the battery Electrical systems; repair group 27.
- Check the battery terminals for corrosion or contamination.
- The battery terminals are cleaned by circular movements of the wire brush for battery poles and terminals.



- The battery poles are cleaned by circular movements of the cleaner for battery terminals and poles, which is placed with the underside on the battery pole.
- After cleaning, comply with the procedure for battery connection Electrical systems; repair group 27.



1.3.4. Treatment with preservatives

Note

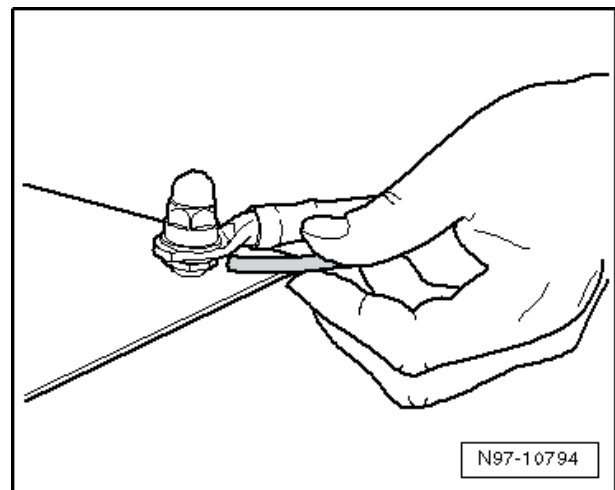
- › The lack of preservatives can cause damage and failure of the on-board power supply.
- › Risk of corrosion.



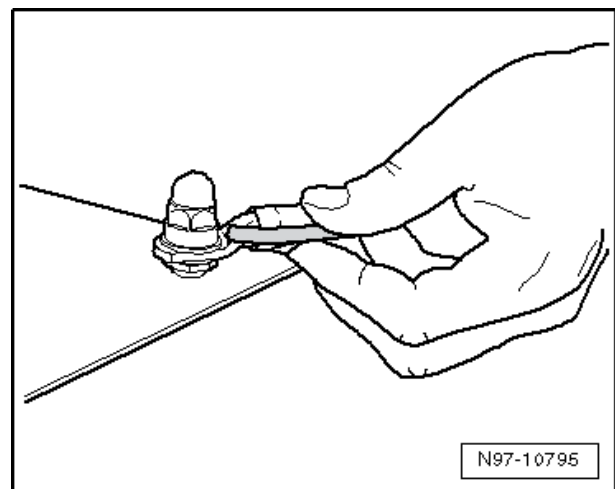
Note

- › All threaded connections must be tightened to the specified tightening torque.
- › Use a container with an attached hose for applying the preservative.
- › Conservation wax is used for cool areas.
- › Conservation wax for cavities is used for warm areas.
- › The preservative automatically penetrates at the appropriate points through the capillary action.

- Keep the hose under the conductor shoe and spray around the pin and cable lug.



- Keep the hose above the conductor shoe and spray around the pin and cable lug



2. Use of recommended tools and devices

2.1.1. Service case VW (VAS 1978B)

The repairs of individual components of the electrical installation (conductors, plug connectors, terminal strips, etc.) of the Škoda vehicles as of model year 1996 must only be carried out using the recommended set of tools and components that are part of the service case.

Currently, it is recommended to use the VW-service case (VAS 1978B) that is also used by other corporate brands for this purpose.

Legend



Note

These symbols with explanations are given in the operating instruction of the service case and describe the various operations for the repair of the electrical installation of the vehicle.

Unlocking devices



Unlocking of secondary fuses



Unlocking of circular rack systems



Unlocking of flat rack systems



Assembly devices

Devices



Stripper



Crimping tool with adapter



Electrical hot-air fan



Hot-air gas fan



Folding knife with a blade



Plug connector for adapter, worldwide

Other pictograms



For more information - see "Technical information"



Warning!



Cutting off



Warming up

Use of devices



Insulation with insulated pliers



Cutting with insulated pliers



Swaged socket fittings with crimping tool



Shrinking with electrical hot-air fan



Shrinking with hot-air gas fan



Cable shortening with folding knife with a blade



Repair of individual conductors



Please observe the following instructions!



Directional arrow



Additional information

The service case VAS 1978B contains the following tools*:

Stripper with conductor cutter (stripping and cutting off the conductor)



Stripper with conductor cutter for stripping and cutting off the conductors.

A stripper of 6-7 mm is used for stripping the conductor ends.



* The description and the symbols are taken from the operating instruction enclosed in the service case.

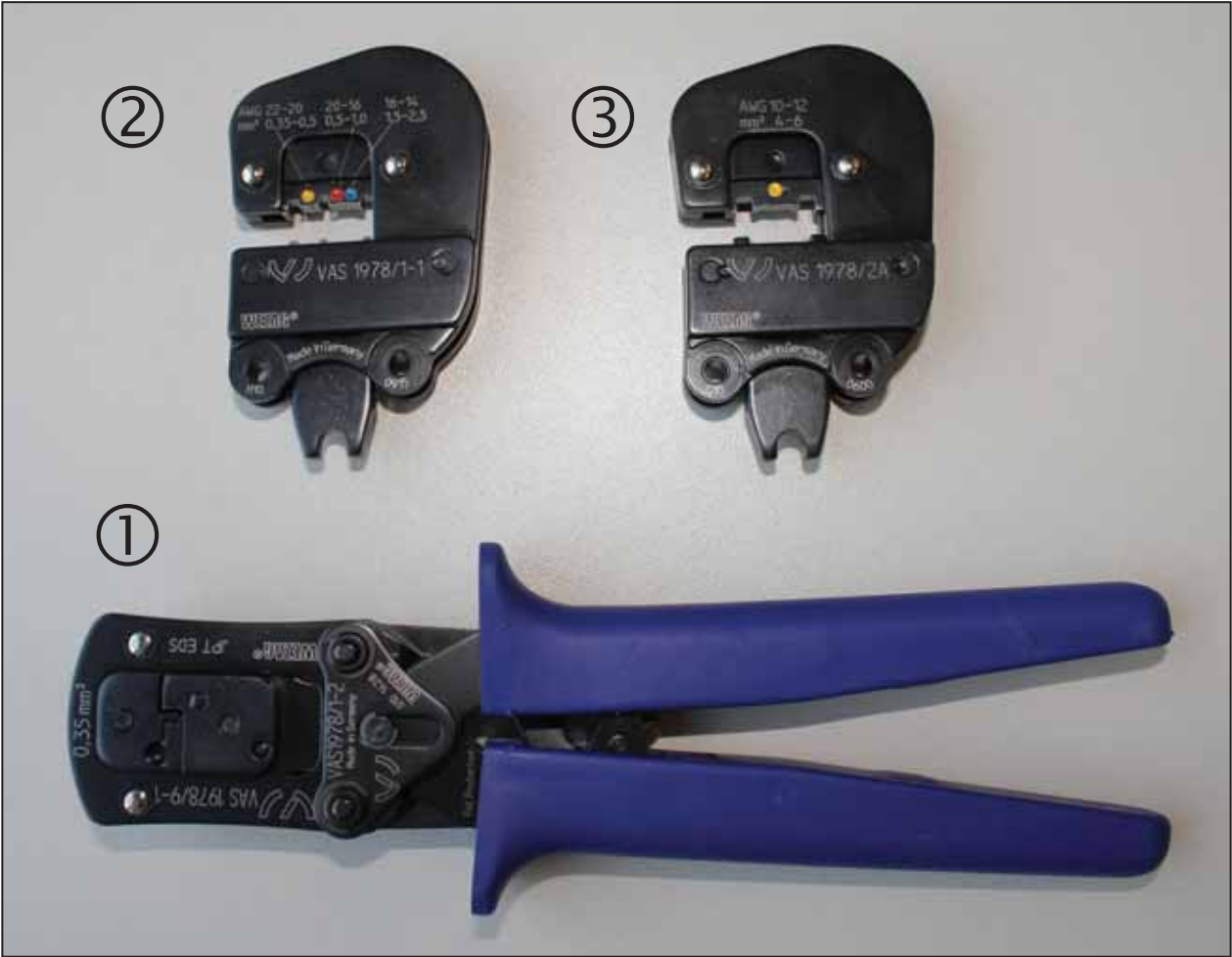
Crimping tool with adapter (crimping head for various sizes of swaged socket fittings)



The service set VAS 1978B includes 4 different sizes of swaged socket fittings.

yellow	2	red	1
for 0.35 mm ²		for 0.5–1.0 mm ²	
blue	1	yellow	1
for 1.5–2.5 mm ²		for 4.0–6.0 mm ²	

- 1 Crimping tool with crimping head for JPT contact
- 2 Crimping head for 0.35–2.5 mm²
- 3 Crimping head for 4.0–6.0 mm²



Electrical hot-air fan with special nozzle (completion, shrinking and connection seal)



NOTE:

The operating instruction for the hot-air fan must be strictly observed!

After pressing in, the swaged socket fitting must be shrunk with a hot-air fan. Warm up the swaged socket fitting in the longitudinal direction from the inside out until the connection seals perfectly and the adhesive flows out.

When pressing, make sure that the other conductors, plastic parts or upholstery do not get damaged with the hot nozzle.

If the repaired conductors were previously bundled, they must be insulated again with a yellow insulating tape. If necessary, you must reattach the conductor with a cable clamp.



Hot-air gas fan with special nozzle (completion, shrinking and connection seal)



NOTE:

The operating instruction for the hot-air gas fan must be strictly observed!

The hot-air gas fan is delivered as part of the equipment upon request. The butane gas (igniter gas) is used, so that gas bottles for refilling can be bought commercially.

The advantage is that it does not have to be fed in.



Folding knife with a blade



- 1 Mechanism for quick and easy replacement of the blades
- 2 Pad under the thumb for maximum pressure
- 3 Fixture of the blade with locking device
- 4 Release lever for quickly snap shutting the blade



In addition to the service case, a set of release tools (cutter) is required for repairing the electrical installation, for releasing the plug connectors from the terminal trips and for their reinstallation, in particular:

- universal device for releasing secondary fuses at terminal strips,
- unlocking devices for flat and circular connectors,
- assembly devices for fitting the seals in the terminal strips.



The use of this set and the correct procedure for unlocking and releasing the plug connectors, including their reinstallation, are described and illustrated in detail in chapter 5 of this SSP and in the relevant operating instructions, which are enclosed with each set of release tools.

Use of service case for the repairs of the electrical installation

The following points are emphasised and extracted from the detailed description of individual operations, see instruction VAS 1978B - technical information (enclosed with each case):



Safety instructions

For all repairs, please keep the current information enclosed in the relevant technical manuals and in the manual "Service Technics".

Important:

Before working on the electrical system, the flat band of the battery must be disconnected. Before carrying out the repair procedure, you must first of all eliminate the cause of the fault (e.g. sharp edges of the body part, defective consumer, corrosion, etc.). For more information, such as the instructions for the installation and removal of individual assembly parts, can be found in the corresponding service manual.

Only yellow conductors must be used for the repair of cable sets. These yellow conductors and all the points at the cable set, that are marked with the yellow insulating tape, identify the previous repair.

A function test must be carried out after each repair. If necessary, you must read off the data in the fault memory and restore the original state of the system.

Assignment of individual conductors, conductor seals, swaged socket fittings, press gutters

Conductor and conductor seal

The service set VAS 1978B does not include all the cable cross-sections used in the vehicle. If the cable cross-section is not available, you must use the next higher cross-section.

Bags which include the service conductors are colour marked. The conductor seals are in compartments that also differ in colour. According to the colour marking, you can select the corresponding press coupling, conductor seal and gutter for the crimping tool.

Example

If you want to use a conductor of 0.5 mm with the red identification from the bag, you must use the colour identification for the following red press coupling. The red press coupling must further be pressed into the gutter of the crimping tool marked in red. The corresponding conductor seal also lies in the compartment with the red identification.

Separate conductor	Cable cross-section in mm ²	Colour identification of the compartments for the conductor seal	Press coupling	Press gutter/ crimping tool
0000 972 002	0,5	red	red	red

Swaged socket fittings, press gutters for crimping tool

The service set VAS 1978B includes four different sizes of swaged socket fittings.

yellow	red	blue	yellow
for 0.35 mm	for 0.5-1.0 mm	for 1.5-2.5 mm	for 4.0-6.0 mm

Contacts, gold contacts

The conductor contacts are available in the standard or gold-plated version.

When carrying out the repair, the contact to be used must always be the same version as the series contact.

The gold contacts are used for example on lambda probes or on knock sensors.

Heat-resistant cables

At various points in the vehicle - especially in the engine compartment - heat-resistant cables are used.

The heat-resistant cables can be recognised on the duller and softer insulation.

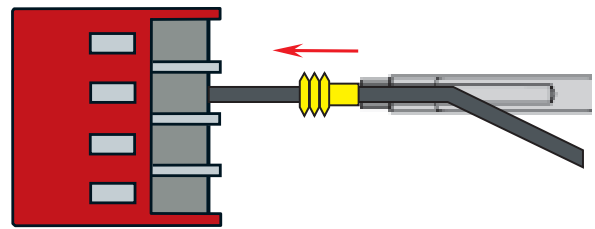
To carry out repairs on these conductors, only the heat-resistant cables must be used.



Conductor seal

The conductor seal protects against dust and ingress of water into the contacts of the fuse body. They are used for example in the engine compartment and are always installed after the repair.

The conductor seal is crimped together with the contact at the conductor in series. This is different when carrying out repairs. Before pressing in the service conductor, you must first fit a seal onto the conductor. While doing so, the stop sleeve at the crimping point must face away from the fuse body (see drawing). The conductor seal must always correspond to the cross-section of the relevant service conductor. The outer diameter refers to the diameter of the fuse body chamber with contacts. For the assembly, only use the appropriate assembly devices.



Description of repair

Make sure that the swaged socket fittings are shifted below one another when repairing certain conductors within a bundle (so that they do not lie side by side).

When interrupting the electrical line, the following steps must be carried out in the following order:

- Cover both parts of the interrupted conductor and loosen from the bundle
- Strip both parts of the broken line
- Connect the line with a press coupling
- Seal the connection (resistance to moisture penetration).

Repair of the uninterrupted conductor at a repair point (with an interruption)

- Cover the conductor to be repaired on each side over a length of approx. 20 cm, starting from the point of interruption and release. If necessary, remove the bandage.
- Insulate the ends of both conductor parts over a length of approximately 6 - 7 mm using an insulated plier.
- Fit the insulated conductor ends into the press coupling of the appropriate size/colour on both sides and press the coupling together with the corresponding press jaw (see colour identification) on both ends using the pliers. Thereby the insulation of the conductor ends must not grip into the conductive coupling part (and must not be pressed). To the contrary, the insulated conductor ends must not protrude from the coupling.
- Subsequently, the swaged socket fitting must be heated along the centre of the coupling towards the outside with a hot-air fan until it fully seals and the sealant flows out. The heating temperature is set according to the requirements of the manufacturer (usually 350 degrees Celsius).



Warning: When fitting the seal, make sure that the hot end of the fan does not damage another cable or the plastic parts.

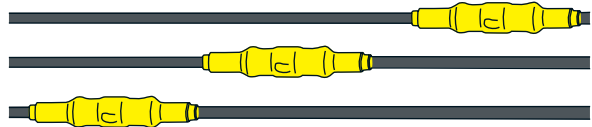
Repair of the interrupted conductor with two repair points (two interruptions)

- Cover and release the interrupted conductor for repair in the vicinity of both interrupted points (see the repair of the interrupted conductor at a repair point)
- For the repair between the points of interruption, use the yellow repair conductor from the case or from the supply of spare parts with the same (initially higher if possible) cross-section as for the repaired cable.
- The repair procedure (selection and use of press couplings, their pressing on and sealing) is consistent with the repair procedure for the interrupted conductor at a repair point.



Installation of swaged socket fittings for repairs of certain conductors within a bundle

- Make sure that the swaged socket fittings are shifted below one another when repairing certain conductors within a bundle (so that they do not lie side by side).





Safety instructions

When repairing the conductors in the area of the airbag and the seat belt tensioners as well as in damp places, certain rules must be observed.

It is possible to repair a maximum of 2 points on each adapter!

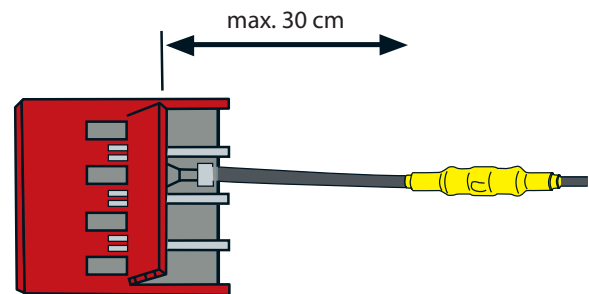
The repair points increase the electrical resistance of the conductor and can cause faults in its own diagnostic system.

Roll up the original cable set including the repair points. Mark the repair point with a yellow insulating tape.

When repairing the airbag conductors and the seat belt tensioners as well as in damp places, you must always crimp the swaged socket fittings. This will prevent corrosion.

Repair points in the area of the airbag or the seat belt tensioner

Points in the area of the airbag or the seat belt tensioners that are being repaired must be located a maximum of 30 cm from the next fuse body with contacts (terminal strips). This, together with the identification using a yellow insulating tape, allows a quick overview of the previously performed repairs.

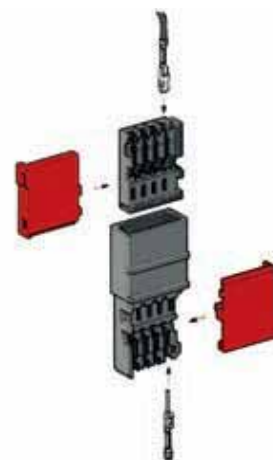


Repairs of the terminal strips (plastic fuse body with contacts)

For technical reasons the fuse body with contacts for the cutting and clamping procedure must only be delivered with cutting and clamping plug contacts.

If you do not need these contacts, you can dispose of them in the same manner as any other fuse body with contacts.

Service conductors are already available with appropriate crimp contacts.
See order information and catalogue of spare parts (EP 198 "Electrical connecting elements").



Cutting and clamping elements

Unlocking and removing the terminal strips (fuse bodies with contacts)

The shapes of fuse bodies with contacts in the operating instruction are only informative and clearly describe the work with the secondary fuse.

General notes

To unlock, always use specific unlocking devices. Contacts must never be released from the fuse body by force. Details can be found in chapter 5.

The damaged fuse bodies with contacts must always be replaced.
A new fuse body with contacts can be ordered via the OTC division Kassel.

The attachments of the chambers and pins can be found partly at the secondary fuse or on the rear of the fuse body with contacts.

The secondary fuse differs from the rest of the fuse body with contacts in its colour. Thus, the identification of the secondary fuse and the work procedure is made easier.

The installation points for the plug connections can be found in the chapters "Circuit diagrams", "Fault Finding - Electrical" or "Installation points".

The detailed description for unlocking the fuse body with contacts can be found in the description of the set for unlocking devices, VAS 1978/35.

To meet the standard of Škoda, another set of tools must be purchased in addition to the set of release tools (cutter) S506840V.



For unlocking individual contact systems, comply with the operating instructions in the manual.

2.1.2. Škoda service case

For repairs of electrical installations in Škoda vehicles as of model year 1996, a set of tools must be used which is also included in the service case of Škoda (the order no. was S 504500V, currently this case is no longer available and it has been fully replaced with the VW service case (VAS 1978B) from which it originated). The tools, devices, components and repair procedure are identical for both cases (for details, see the relevant instructions enclosed with the sets).

The Škoda service case does not include a set of release tools ("cutter") to release the contacts of the terminal strips. For the repairs of the terminal strips with plug connectors, this service case is supplemented either.

A) with the set of release tools S 506815V and S 506825V

or

B) with the set of release tools VAS 1978/35, supplemented with the set S 506840V.

The use of all the sets is explained in the relevant operating instructions enclosed with the sets.

3. List of valid TPI referring to the repairs of the electrical installation in Škoda vehicles

- 2014734 faults in the Parking Assist System (Octavia II)
- 2018564 (fill in the designation)
- 2026007 faults in the engine electronics, caused by the collision of the electric motor bundle (Fabia II)
- 2027432 rain penetrating the terminal strips for fog lights, daily lighting, horn and into the terminal strip which feeds the independent heating (Superb II).

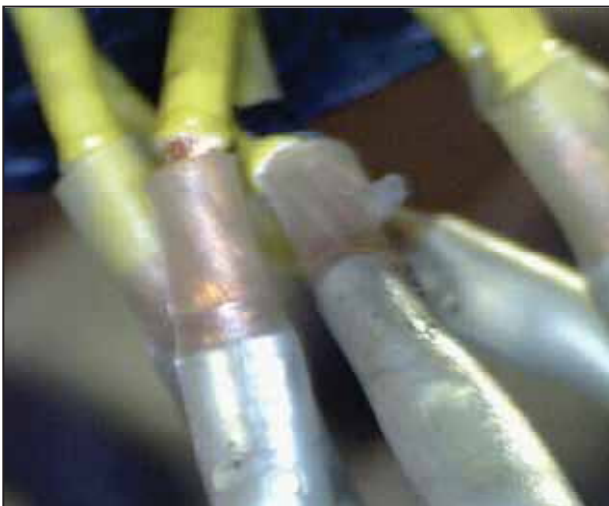


The details regarding this technical product information as well as the other newly issued TPI, can be found in ELSAPro or in the portal B2B.

4. Common errors when carrying out repairs to the electrical installation

4.1. If the correct repair procedure is not observed, the following can occur

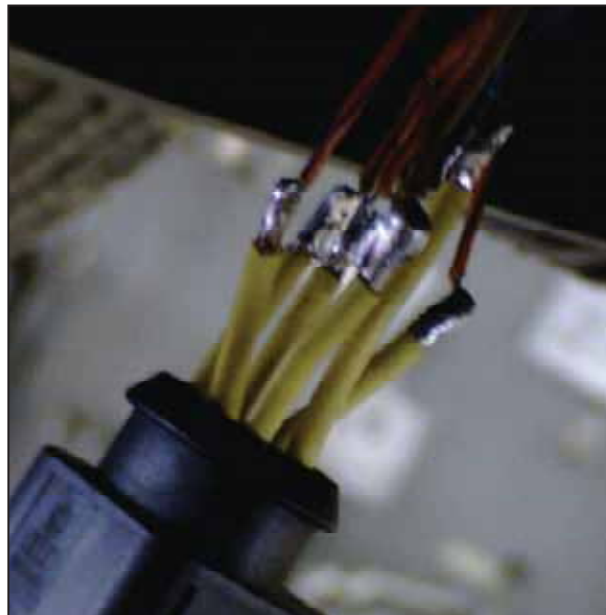
- a) Faulty insulation of the cable connection near the lambda probe (possibility of moisture penetrating the terminal strips of the lambda probe). The repair was not properly carried out TPI 2018564.



Correct procedure

Use a service case to insulate the conductor ends so that the conductor insulation is ensured and moisture penetration is avoided when using the corresponding press coupling and the following connector seal.

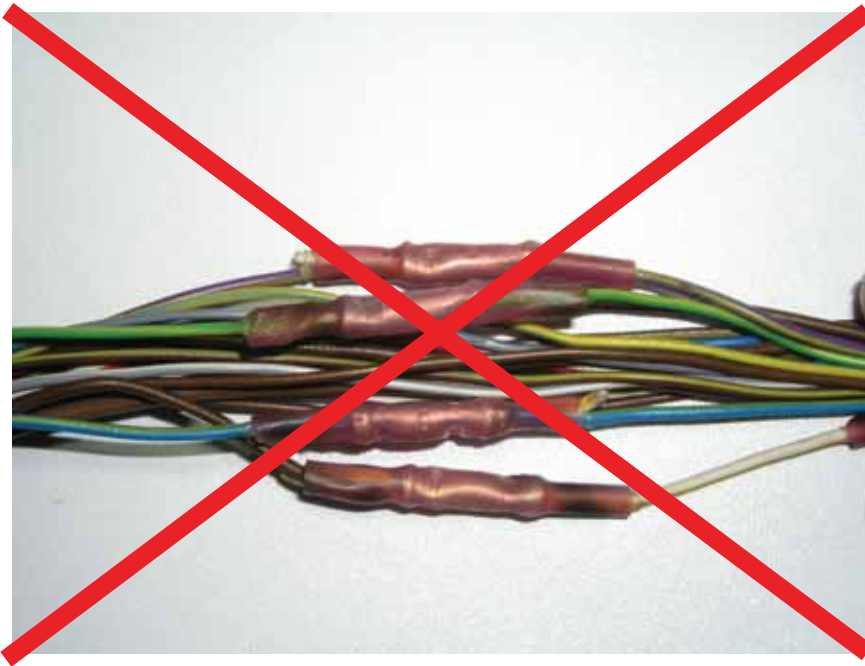
- b) The connection of interrupted conductors near the lambda probe is carried out by soldering (breakage of the soldered connection during operation, inadequate moisture protection).



Correct procedure

Do not solder when repairing the electrical system of Škoda vehicles (see the general repair instructions for cable sets and plug connectors in the workshop manual). Use a service case in order to connect the corresponding conductors with the relevant press coupling and seal with the hot-air fan.

- c) When repairing the conductor bundle, re-establish the connection of several interrupted conductors at the same position in the bundle (problems that arise from the increased diameter of the bundle at the repair point).



Incorrect!

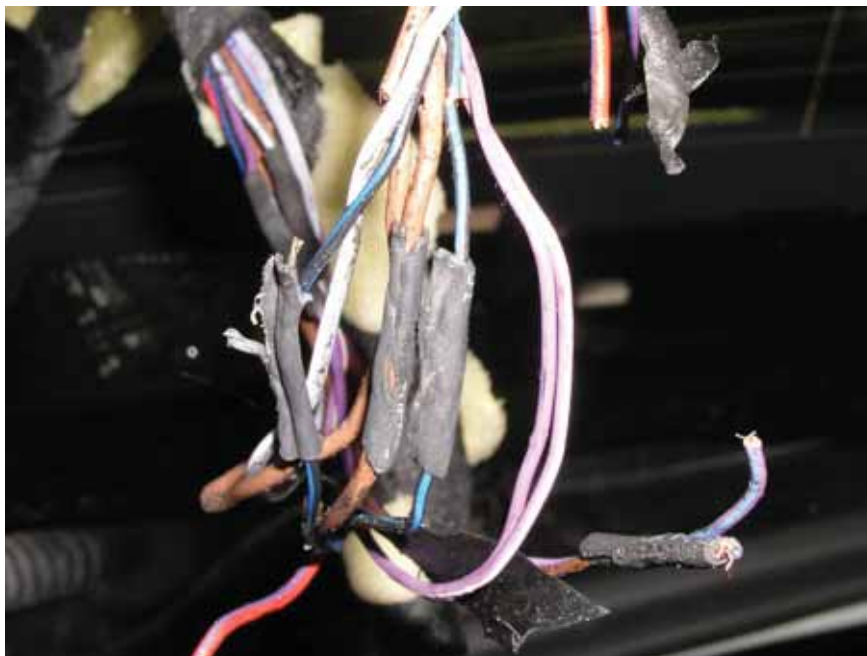


Correct

Correct procedure

Observe the operating instruction enclosed in the service case (see chapter 2 of this SSP, description of repair) and the connection points of individual conductors shifting against each other).

- d) The wrong choice of the connection for conductors e.g. repair of the broken/interrupted conductor bundle for the side or rear door at the point where the bundle bends when opening and closing the door (even after the repair has been performed correctly, breaking of the repaired conductor will reoccur in close proximity to the press coupling after a short period of time).



Correct procedure

Carry out the repair (connecting a new conductor with the recommended press coupling including seal) at the point where breaking of the bundle cannot occur when the door is opened or closed.

- e) Failure to comply with correct values and incorrect attachment of the fuses when exchanging them in the E-box (and the consequential problems and faults during vehicle operation).

Incorrect attachment of the fuses in the E-box



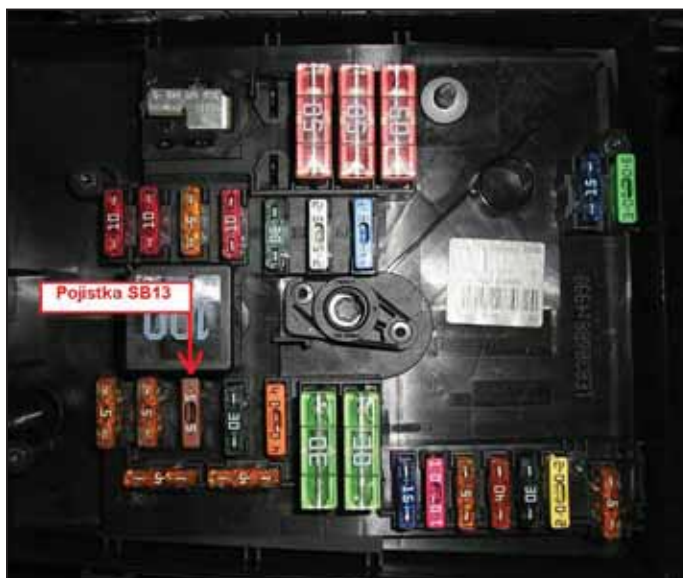
The fuse SB12 (5 A) is missing in the position F12 (incorrectly fitted in the position F11), the fuse SB19 (30 A) is missing in the position F19 (incorrectly fitted in the position F18). The vehicle cannot be started if the fuses are not fitted correctly.

Incorrect value of the fuse

Instead of the fuse SB13 with the correct value (30A), the fuse with the value 5A was fitted during the repair.

While driving, the indicator light for lubrication lights up and the display "Switch off engine" comes on.

The engine has stalled and could no longer be started.



Correct procedure

Checking the fuse assembly in the E-box, replacing the poorly equipped fuses.

When replacing the fuses, observe their correct value and proper attachment in the E-box.

4.2. Problems that may arise when installing non-original equipment and accessories in Škoda vehicles

4.2.1. Additional installation of electrical equipment - Point of view of the company Škoda Auto

Škoda Auto recommends that only electrical equipment is installed in Škoda vehicles, that was approved by the Škoda departments.

The additional installations of non-approved equipment and modifications of the electrical equipment of the vehicle are not supported by Škoda Auto (see TI-07-001 on portal B2B).

When installing approved equipment, proceed exactly according to the specific installation instruction.

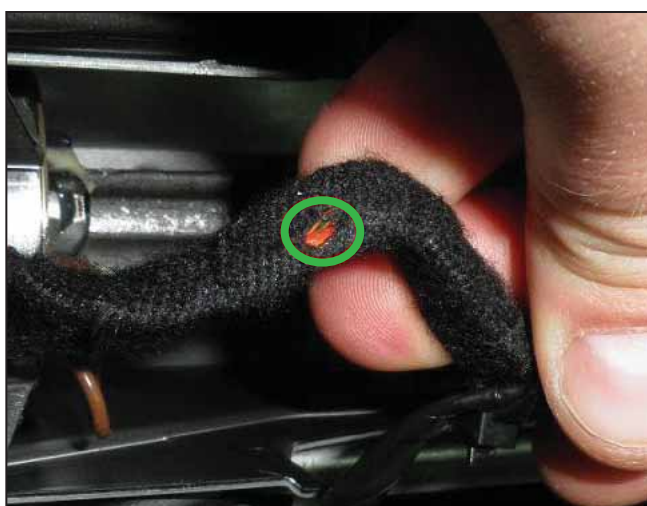
If the installation procedure is not observed (or when additionally installing non-approved equipment), not all of the electrical functions of the vehicle will operate correctly. There may even be damage to the control units of the vehicle.

In case of a complaint about a vehicle which was retrofitted with non-approved electrical equipment, this equipment must be switched off before repairing or transmitting a "technical repair request" (the vehicle must be restored back to its original condition).

If this is not done and it is determined that the fault was caused by an unauthorised additional installation, the service is redebited by the warranty department.

4.2.2. Examples of service practice

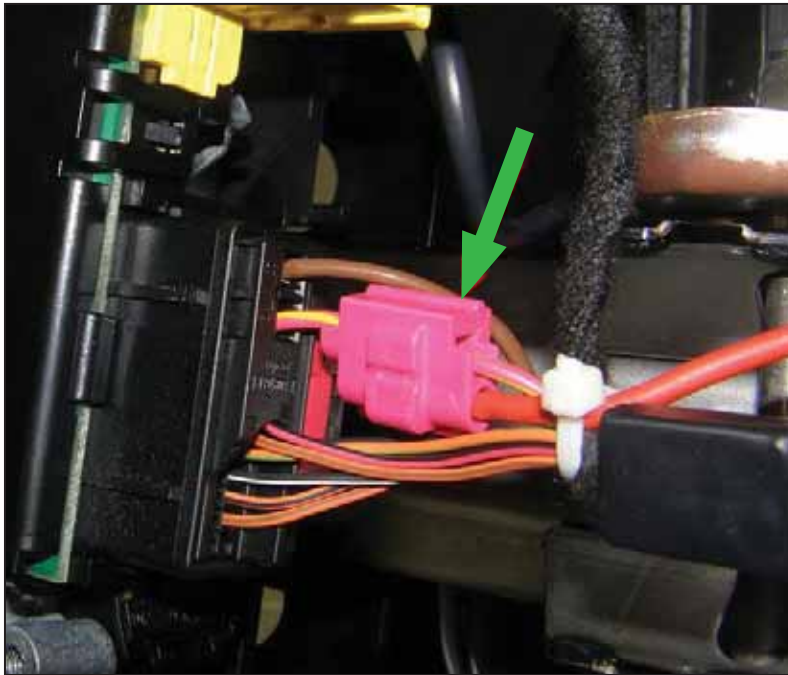
- a) When installing the non-original GPS, the GPS cable set was fitted to the original electric installation of the vehicle (to the cable set of the QC steering column electronics J527 and instrument panel). This prevented the original bundle from moving freely, jamming and colliding with the steering column. The malfunction of the insulation package, the body end of the conductor and the breakage of the fuse SC39 have been the cause of the engine shutting off while driving and it was not possible to restart the engine.



Correct procedure

Guide and fasten the cable set of the non-original accessories in such a way that a malfunction of the original electrical installation does not occur (whereby the point of view of Škoda in regards to additional installations of electrical equipment applies).

- b) When fitting the drawgear in a non-branded service station, a supply conductor of the drawgear was connected to the supply conductor of the QC steering column electronics. The conductor coupling was carried out improperly with a quick release coupling (see figure), that has caused the interruption of the feed for the QC column electronics J527. The vehicle has stopped while driving and the engine could not be restarted.



Correct procedure

Carry out the installation of the approved type of drawgear for the vehicle in a standard way according to the installation instruction, which was approved by the vehicle manufacturer (see the point of view of Škoda).



Important note

At the end of this chapter it must be emphasised once more that when relating to the complaint settlement in regards to the failure of the electrical installation in Škoda vehicles as a cause of the use of incorrect tools and equipment, non-compliance with prescribed repair procedures, where appropriate, the installation of non-approved equipment and accessories in the vehicle is proven, the appropriate complaint to the responsible departments of Škoda is recognised in any case or covered (the cost of repair and the correction of the consequences of the failure are covered by the responsible who caused the error by ignoring the rules and recommendations, no matter whether it is to the service organisation or the owner of the vehicle or not).

5. Repairs of the plug connectors and terminal strips

5.1. Recommended set of release tools

In order to meet the standards of Škoda, the set of release tools recommended by the manufacturer for the repair of plug connectors and terminal strips must be used ("cutter"), e.g. VAS 1978/35, supplemented by the set S 506840V or the set of release tools S 506815V and S 506 825V, which have been recommended for the repairs of the plug connectors and terminal strips using the service case of Škoda S 504500V).

Basic rules for removing the plug connectors with the release and recommended tools:

1. Determine whether the corresponding plug connector is secured with a secondary lock (if yes, first of all lock in the recommended way).
2. Select a correct and undamaged tool which is intended for releasing and removing the plug connector in the corresponding terminal strip.
3. Handle carefully (use minimum force when unlocking the locking tang) do not damage the terminal strip while doing so).
4. Release the plug connector with back pressure (never by pulling it!).
5. Carefully press on the release and recommended tool up to the chamber end of the terminal strips (possibly up to the fixed stop), hold it in this position while removing the plug connector without force.

5.2. Using the set for unlocking and removing the plug connectors with conductors from the terminal strips

5.2.1. Secondary unlocking

Prior to unlocking and removing the plug connectors from the terminal strips, the so-called secondary fuse must be unlocked. While doing so, only the prescribed unlocking devices must be used. (see instructions for use of individual sets of release tools).

Examples for unlocking

- a) Take out the safety comb



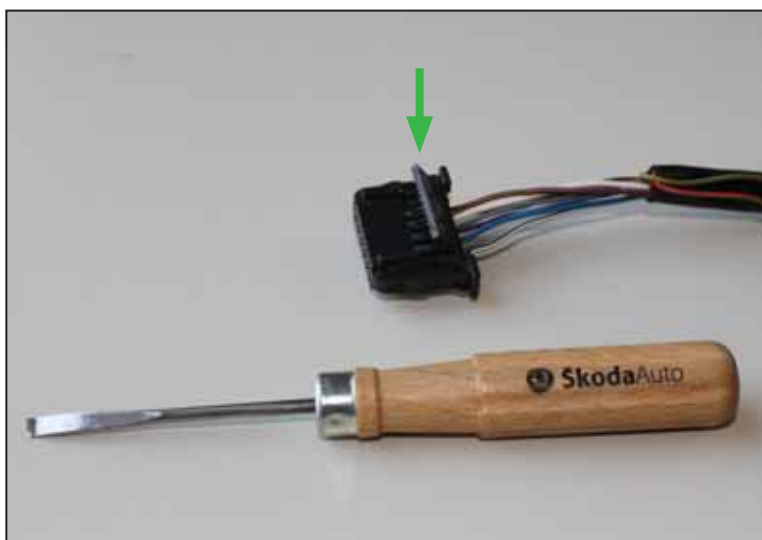
NOTE:

In some cases, the secondary unlocking is carried out by shifting the safety comb a few mm (pull it out a little) straight ahead and thus the safety comb must not be fully removed from the terminal strip.

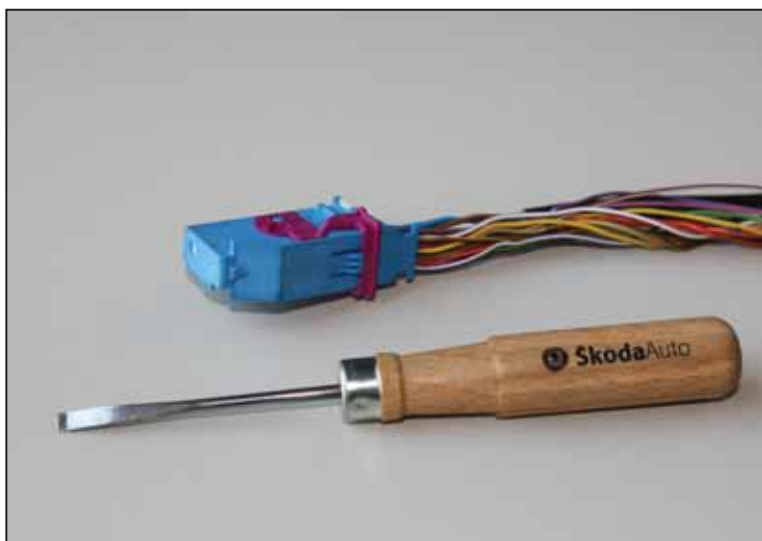
Safety comb – another example for unlocking



b) Open the flap (see arrow)



c) Lock the stop



After locking the stop, pull out the terminal strip with the plug connectors.

5.2.2. Primary unlocking of the plug connectors in the terminal strip

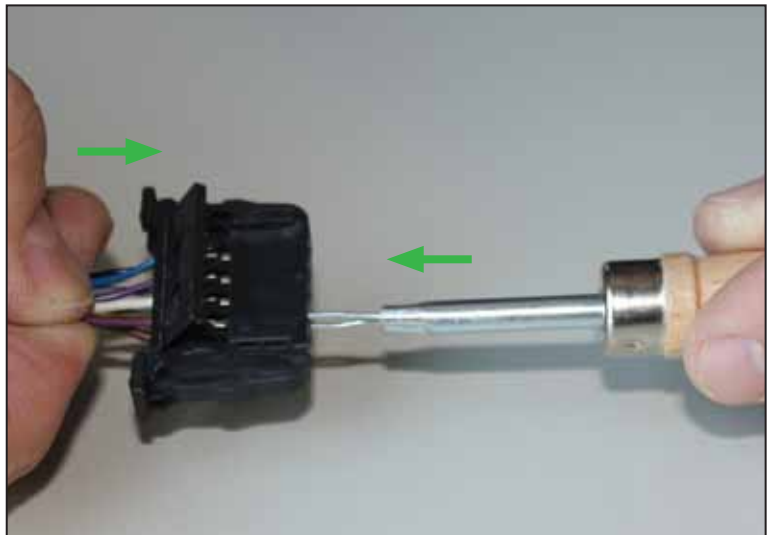
Only use the prescribed unlocking devices according to the operating instructions referring to the individual sets of release tools for the primary unlocking and removal of the plug connectors from the body of the terminal strips, as well as for their reinstallation and sealing.

Examples for unlocking

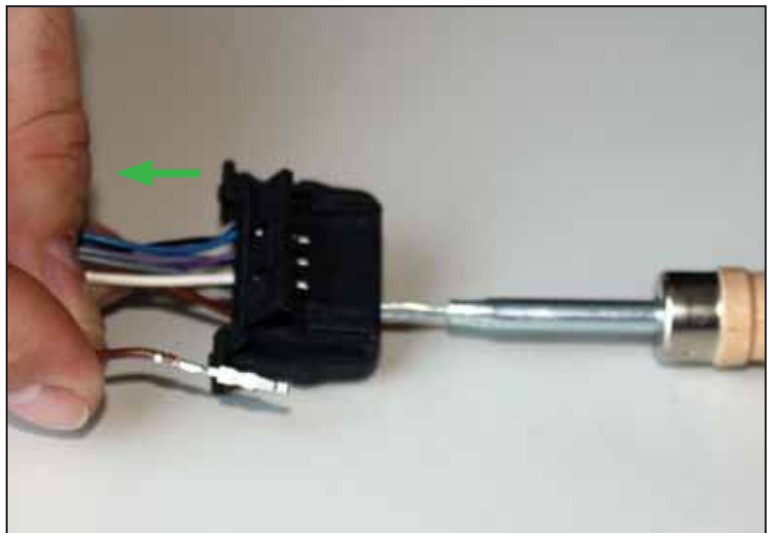
a) Releasing the secondary fuse

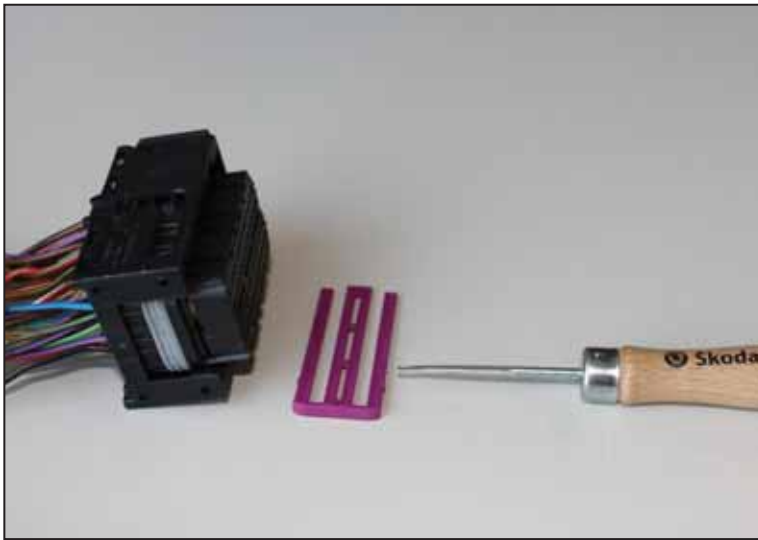


Releasing the plug connector with the prescribed tool

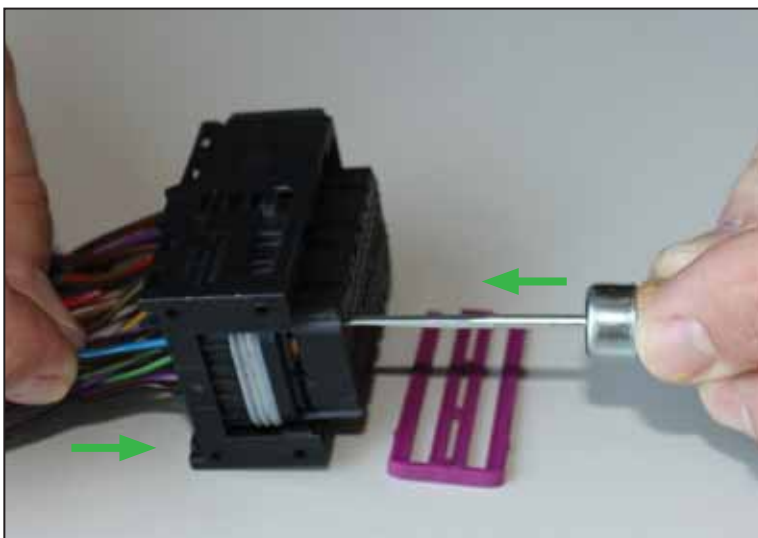


Removing the plug connector with conductor

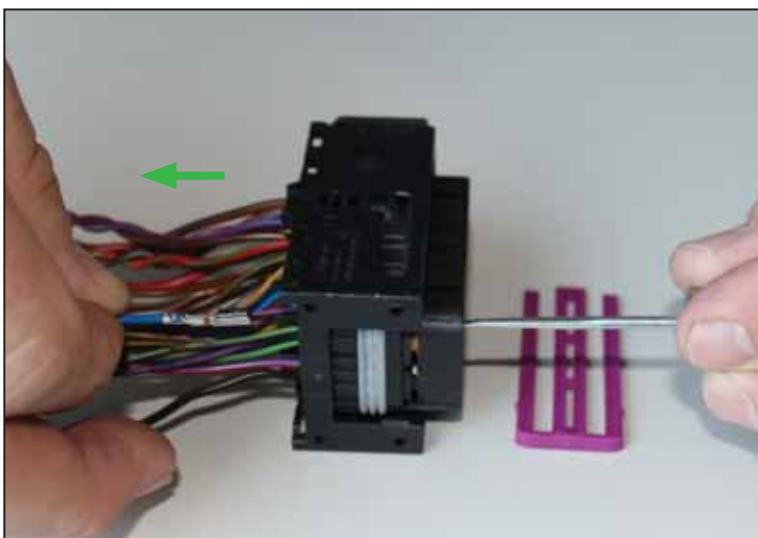




c) Releasing the secondary fuse



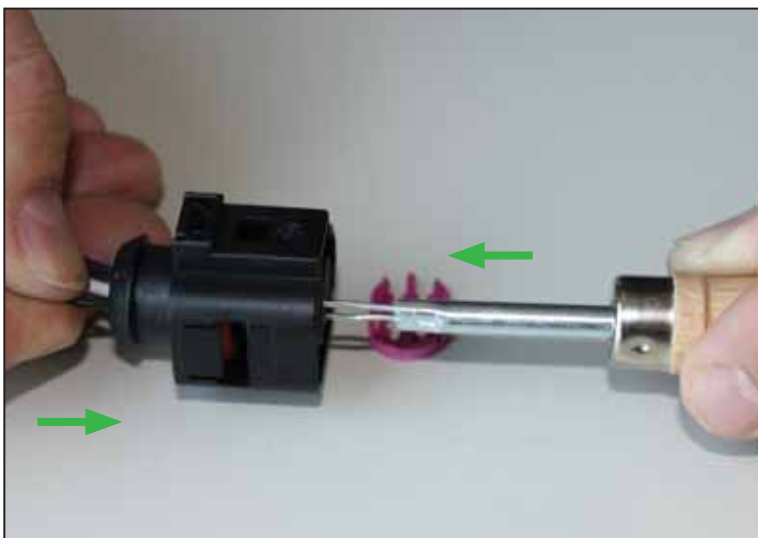
Releasing the plug connector with the prescribed tool



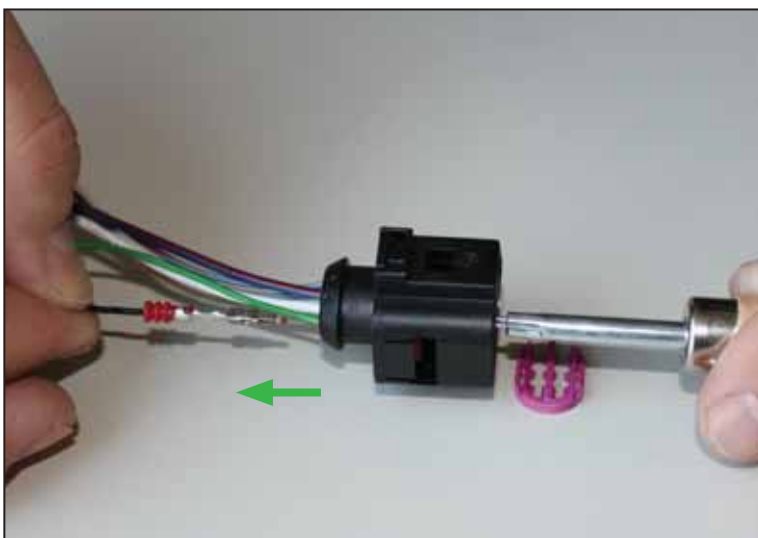
Removing the plug connector with conductor



d) Releasing the secondary fuse



Releasing the plug connector with the prescribed tool



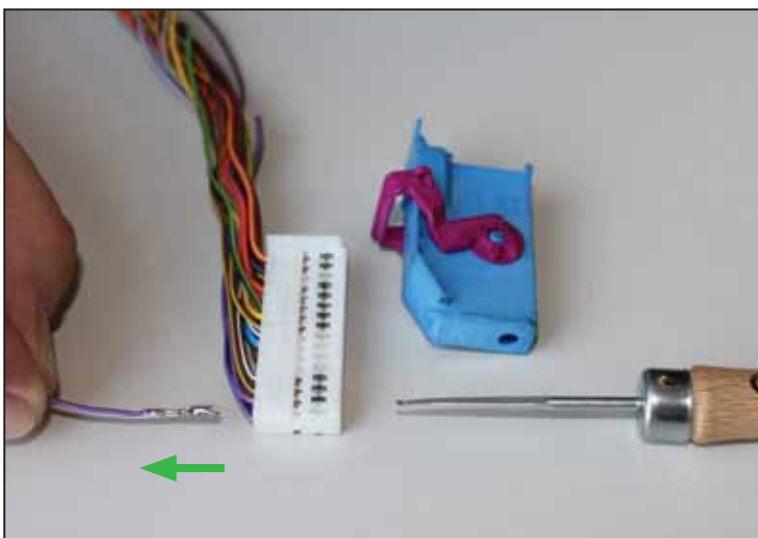
Removing the plug connector with conductor



e) Removing the terminal strip with plug connectors after releasing the secondary fuse (stop)



Releasing the plug connector with the prescribed tool



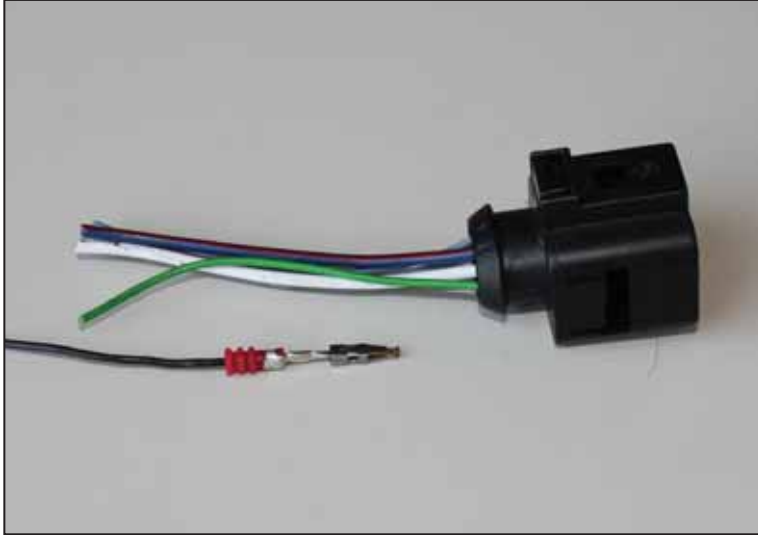
Removing the plug connector with conductor

5.2.3. Installing the conductor with seal in the terminal strip

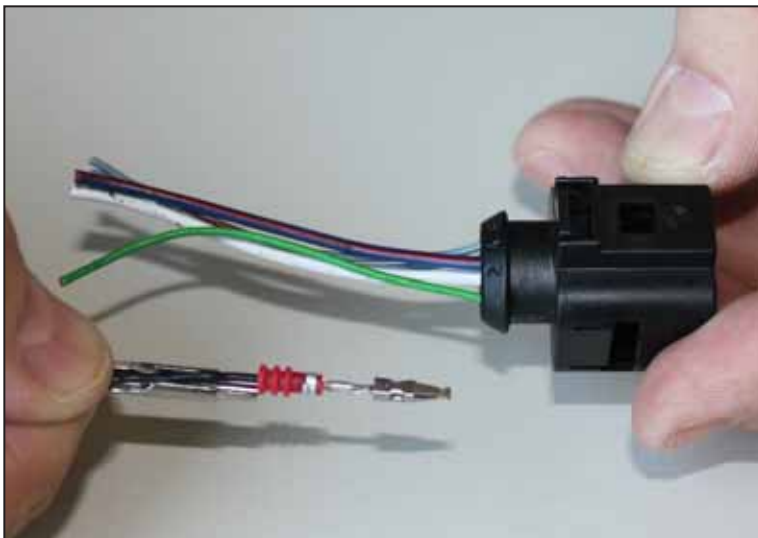
The procedure is described in the operating instruction for the service case and even for the set of release tools. Installing the conductor with seal in the terminal strip is described on page 22 of this brochure. Assembly devices for conductors with seal (set of release tools VAS 1978/35).



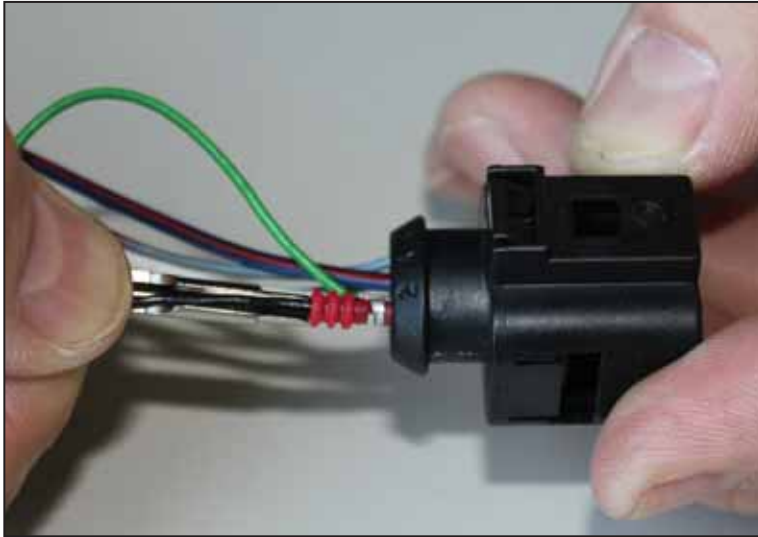
Examples for installing the conductors with seal in the terminal strips



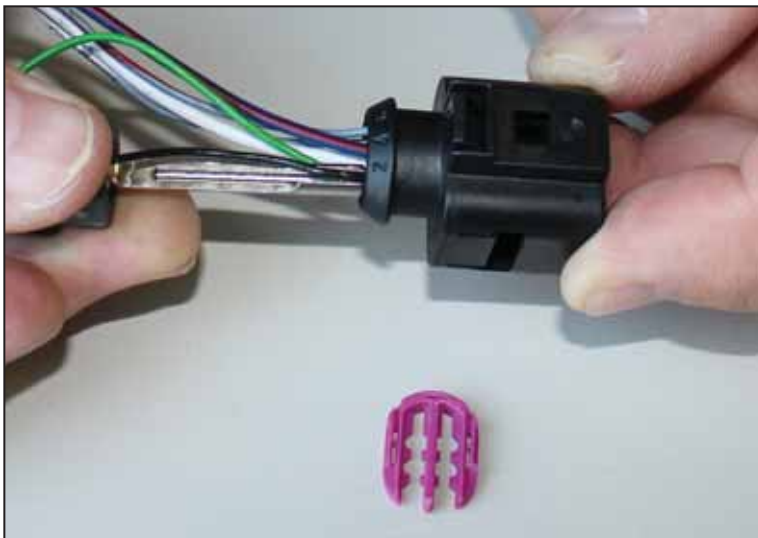
a) Conductor with plug connector and seal ready for installation



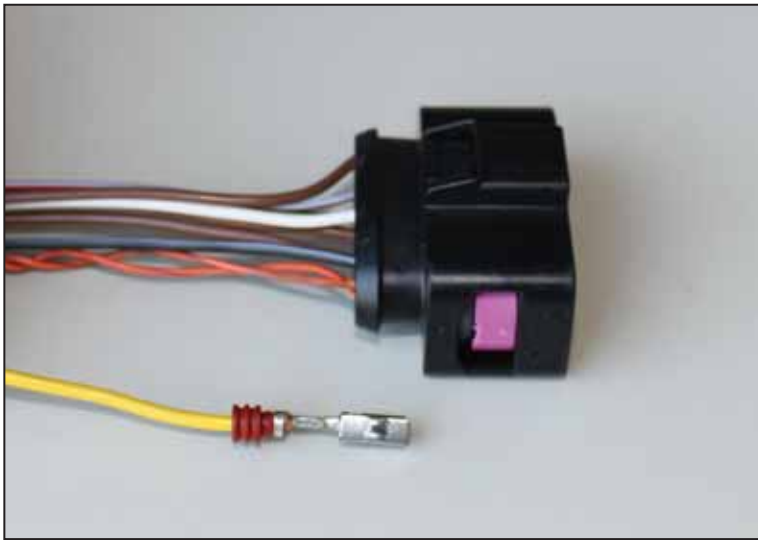
Inserting the conductor with seal in the assembly device



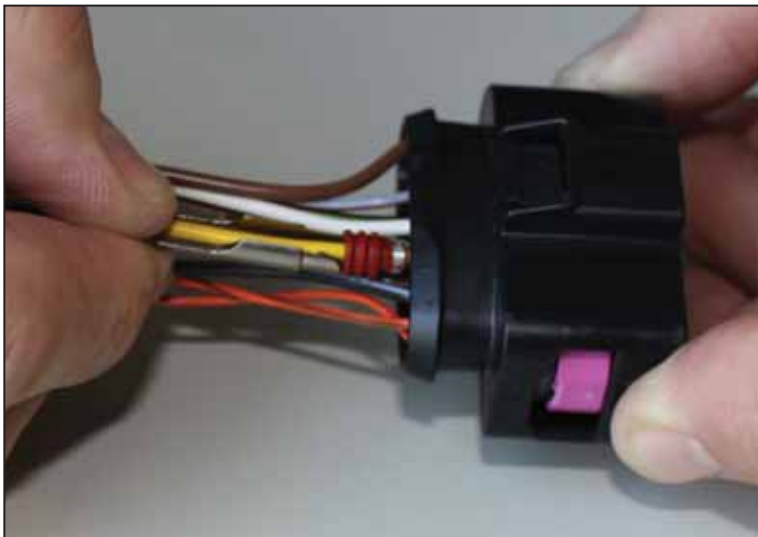
Inserting the plug connector with seal into the terminal strip



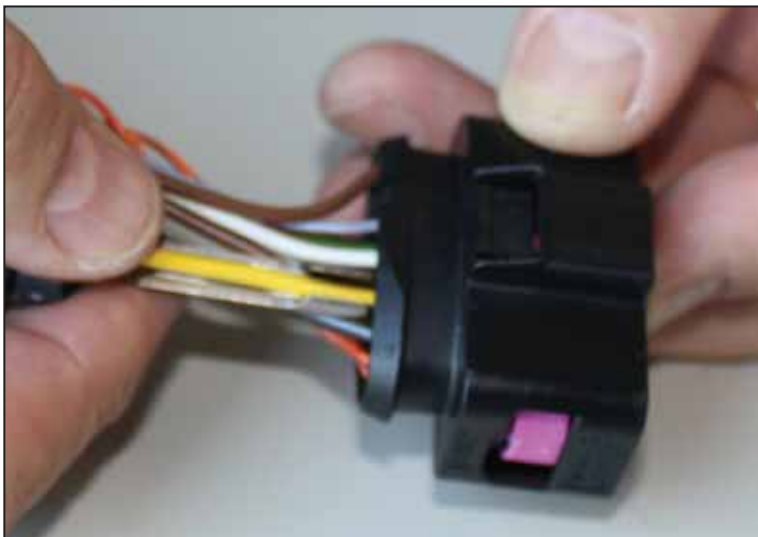
Pressing the seal into the terminal strip (up to the stop)



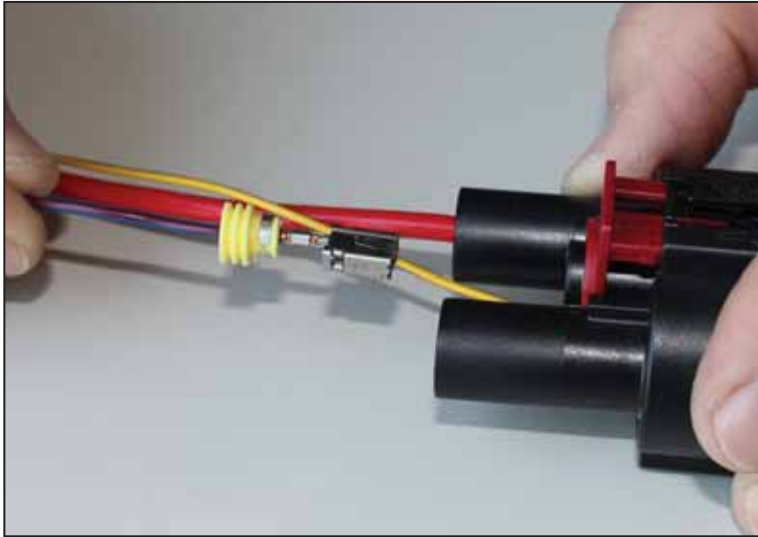
b) Conductor with plug connector and seal ready for installation



Inserting the plug connector with seal into the terminal strip (with the use of the assembly device)



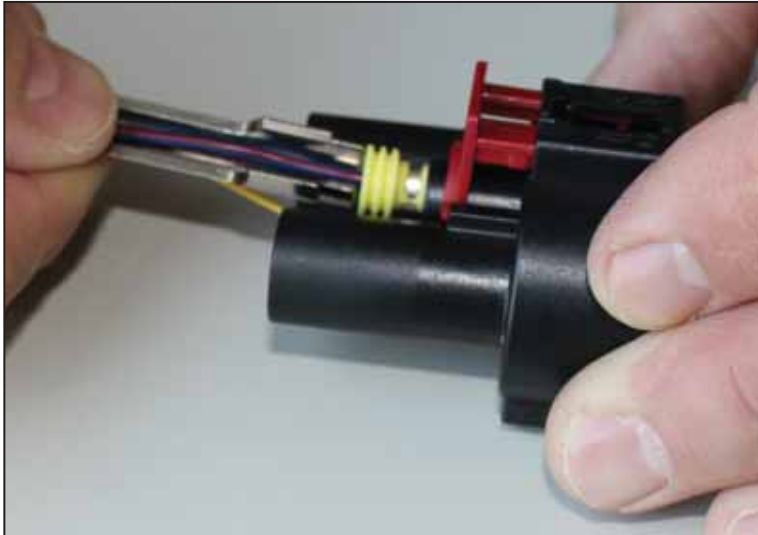
Pressing the seal into the terminal strip (up to the stop)



c) Conductor with plug connector and seal ready for installation



Inserting the conductor with seal in the assembly device



Inserting the plug connector with seal into the terminal strip



Pressing the seal into the terminal strip (up to the stop)

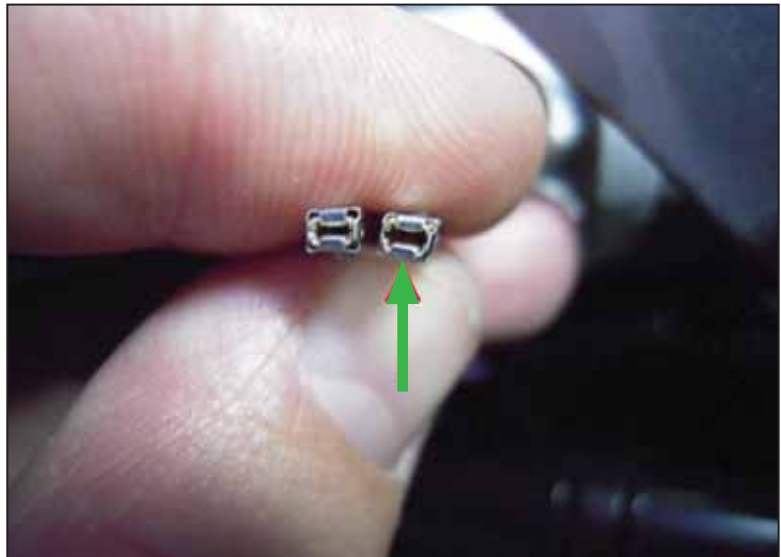


Important note

The prerequisite for a successful fault elimination which has been repeated several times in full scope is also valid for the repairs of plug connectors and terminal strips: Use only recommended tools and procedures. If a fault occurs by ignoring the rules and recommendations of the manufacturer, neither the appropriate complaints are acknowledged nor the cost of the repair is covered by the company Škoda Auto.

5.2. Selected cases of incorrect repair procedures for plug connectors and terminal strips

- a) When repairing the electrical installation of the QC gearbox, the incorrect release tool was used and for this reason there has been damage to the terminal strip socket and the corresponding pin (it was the CAN high conductor between the terminal strip T25 and the QC gearbox). The vehicle stopped while driving and the ESP warning light came on. The cause was the lack of contact on the deformed pin in the terminal strip (see figure below).



Correct procedure

When repairing plug connectors and terminal strips, always use the recommended tools, devices and components and proceed according to the manufacturer's recommendations.

Notes

Notes

Notes

Overview of the previously edited self-study programmes

No. Designation

- 1 Mono-Motronic
- 2 Central locking
- 3 Vehicle alarm
- 4 Working with wiring plans
- 5 ŠKODA FELICIA
- 6 Safety of the ŠKODA vehicles
- 7 Principles of ABS - not published
- 8 ABS - FELICIA
- 9 Immobilizer with transponder
- 10 Air conditioning in the vehicle
- 11 Air conditioning FELICIA
- 12 1.6 engine - MPI 1AV
- 13 Four-cylinder diesel engine
- 14 Power-assisted steering
- 15 ŠKODA OCTAVIA
- 16 1.9 ltr. TDI diesel engine
- 17 ŠKODA OCTAVIA Convenience electronics system
- 18 ŠKODA OCTAVIA Mechanical gearbox 02K, 02J
- 19 1.6 ltr. and 1.8 ltr. petrol engines
- 20 Automatic gearbox - fundamentals
- 21 Automatic gearbox 01M
- 22 1.9 ltr./50 kW SDI, 1.9 ltr./81 kW TDI diesel engines
- 23 1.8 ltr./110 kW and 1.8 ltr./92 kW petrol engines
- 24 OCTAVIA, CAN BUS databus
- 25 OCTAVIA - CLIMATRONIC
- 26 OCTAVIA - Vehicle safety
- 27 OCTAVIA - 1.4 ltr./44 kW engine and gearbox 002
- 28 OCTAVIA - ESP - fundamentals, design, function
- 29 OCTAVIA 4 x 4 - all-wheel drive
- 30 2.0 ltr. 85 kW and 88 kW petrol engines
- 31 Radio navigation system - design and function
- 32 ŠKODA FABIA - technical information
- 33 ŠKODA FABIA - electrical systems
- 34 ŠKODA FABIA - electro-hydraulic power-assisted steering
- 35 1.4 ltr. - 16 V 55/74 kW petrol engines
- 36 ŠKODA FABIA - 1.9 ltr. TDI Unit injection
- 37 Mechanical gearbox 02T and 002
- 38 ŠkodaOctavia; model 2001
- 39 Euro-On-Board-Diagnosis
- 40 Automatic gearbox 001
- 41 Six-speed gearbox 02M
- 42 ŠkodaFabia - ESP
- 43 Exhaust emissions
- 44 Extended service intervals
- 45 Three-cylinder petrol engines 1.2 ltr.
- 46 ŠkodaSuperb; Vehicle presentation; part I
- 47 ŠkodaSuperb; Vehicle presentation; part II
- 48 ŠkodaSuperb; 2.8 ltr./142 kW V6 petrol engine
- 49 ŠkodaSuperb; 2.5 ltr./114 kW TDI V6 diesel engine
- 50 ŠkodaSuperb; automatic gearbox 01V

No. Designation

- 51 2.0 ltr./85 kW petrol engine with balancing shafts and 2-stage suction line
- 52 ŠkodaFabia; 1.4 ltr. TDI engine with the unit injection system
- 53 ŠkodaOctavia; Vehicle presentation
- 54 ŠkodaOctavia; Electrical components
- 55 FSI petrol engines; 2.0 ltr./110 kW and 1.6 ltr./85 kW
- 56 Automatic gearbox DSG-02E
- 57 Diesel engine; 2.0 ltr./103 kW TDI with pump-nozzle units, 2.0 ltr./100 kW TDI with pump-nozzle units
- 58 ŠkodaOctavia, Chassis and electromechanical power-assisted steering
- 59 ŠkodaOctavia RS, 2.0 ltr./147 kW FSI turbo engine
- 60 2.0 ltr./103 kW 2V TDI diesel engine; particle filter with additive
- 61 Radio navigation systems in Škoda vehicles
- 62 ŠkodaRoomster; Vehicle presentation part I
- 63 ŠkodaRoomster; Vehicle presentation part II
- 64 ŠkodaFabia II; Vehicle presentation
- 65 ŠkodaSuperb II; Vehicle presentation part I
- 66 ŠkodaSuperb II; Vehicle presentation part II
- 67 2.0 ltr./125 kW TDI diesel engine with Common Rail injection system
- 68 1.4 ltr./92 kW TSI petrol engine with turbocharger
- 69 3.6 ltr./191 kW FSI petrol engine
- 70 All-wheel drive with Haldex coupling of the IV. generation
- 71 ŠkodaYeti; Vehicle presentation part I
- 72 ŠkodaYeti; Vehicle presentation part II
- 73 LPG system in Škoda vehicles
- 74 1.2 ltr./77 kW TSI petrol engine with turbocharger-supercharging
- 75 7-speed dual-clutch automatic gearbox 0AM
- 76 Green-line vehicles
- 77 Geometry
- 78 Passive safety
- 79 Auxiliary heating
- 80 2.0 ltr., 1.6 ltr., 1.2 ltr. diesel engines with Common Rail injection system
- 81 Bluetooth in Škoda vehicles
- 82 Vehicle sensor - drive mechanism
- 83 1.4 ltr./132 kW TSI petrol engine with dual-charging (compressor, turbocharger)
- 84 ŠkodaFabia II RS; Vehicle presentation
- 85 KESSY system in Škoda vehicles
- 86 START-STOP system in Škoda vehicles
- 87 Immobilisers in Škoda vehicles
- 88 Brake and stabilisation systems
- 89 Sensors in Škoda vehicles - Safety and Convenience
- 90 Improve customer satisfaction with the help of the CSS study

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